Magnetic Resonance in Solids, 2013, vol.15, N1

TEMPOL as a polarizing agent for dynamic nuclear polarization of aqueous solutions

Gafurov M.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

High-resolution proton NMR (400 MHz) and multifrequency EPR (9 - 260 GHz) characterization of aqueous solutions of the nitroxyl radical TEMPOL in the temperature range (10 - 40) °C is performed for the liquid-state DNP. Characteristic features of the in-situ DNP observations at high frequencies are presented. Optimal conditions (concentration, temperature, position of the microwave pumping, repetition/build-up time for the DNP experiments) are extracted. The results are compared with the DNP experiments, molecular dynamic calculations, saturation models, and classical models of translational and rotational diffusion. Perspectives for using TEMPOL as polarizing agent in even higher magnetic fields are discussed.

Keywords

DNP, EPR, Nitroxide, NMR, Overhauser effect, Polarizing agent